

SYSTEM DYNAMICS MODEL OF LABOR MARKET FUNCTIONING IN UKRAINE

The goal of our investigation is to develop the system dynamics model of the labor sector for Ukraine. It consisted of conducting a structure in a way to make it appropriate to Ukrainian economy and estimating the parameters that are relevant for Ukraine. We examine if the model, constructed by means system dynamics, replicates the real behavior of the economy and thus if it can be useful in studying and analyzing the labor sector of Ukraine.

We started our work by analyzing the structure of the model and deciding about structure that should be made to reflect Ukrainian labor market properties. Afterwards, we collected data for all the input variables to include them as table functions in the model, and for the output variables to compare them with the model results in the end. The next task was to estimate the parameters using sensitivity analysis. Then, we initialized the model in equilibrium and applied shocks to the input variables to analyze how in that case the outputs would behave. After that, we compared the historical data on the output variables with the results that the model produced using Theil Statistics to see what the error was. The Figure 1 shows the system dynamic model that we used when analyzing the labor force of Ukraine.

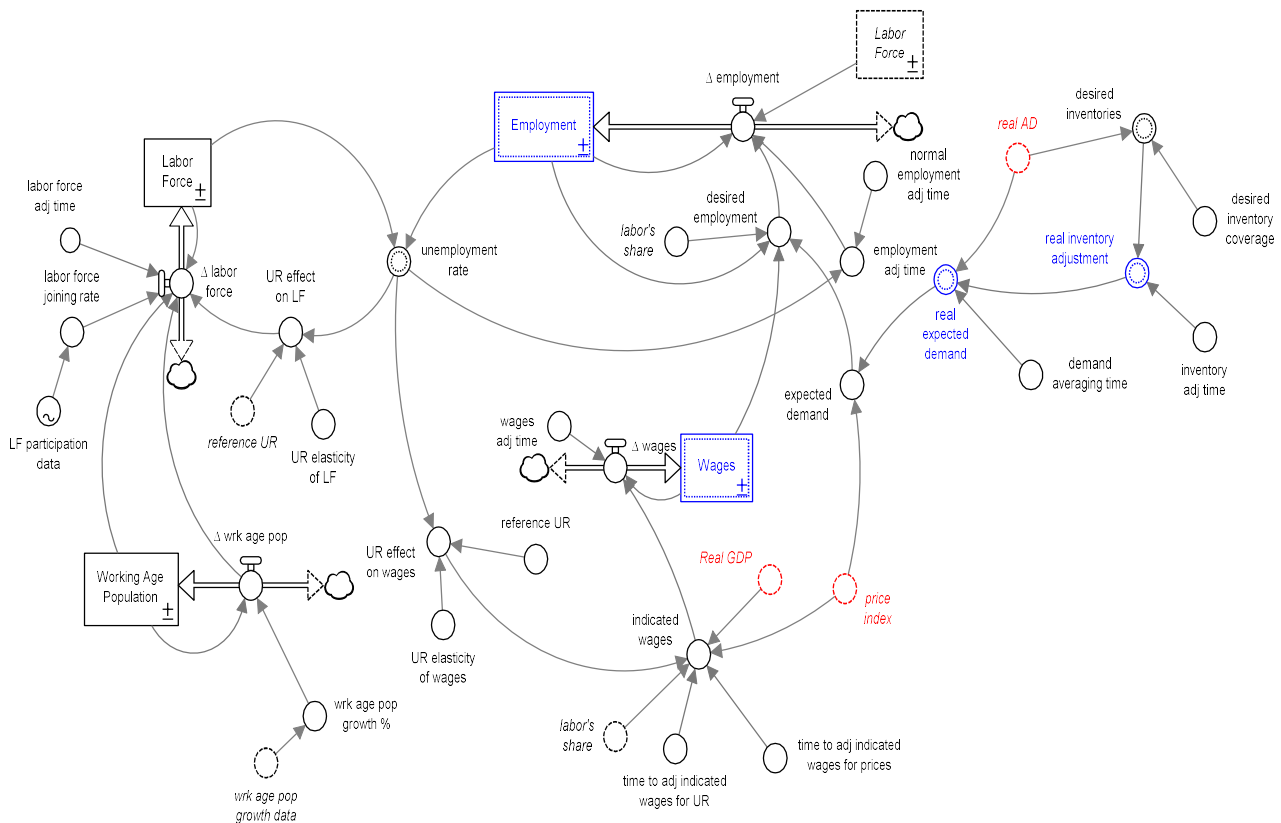


Figure 1. Ukrainian Labor Market System Dynamic Model

The time horizon in our model is 2005-2013. The data is annual. The input variables we found data on were: GDP, aggregate demand, price index, working age population growth and change in inventories. The time series data to be used for comparison with the model behavior was the data on: unemployment rate, employment, wages, labor force, labor force participation and working age population.

After we estimated all the parameters, we obtained a certain fit of the model results on the outputs to the historical data. To analyze if the fit was good, we used Theil statistics. For the employment, for example, the bias part includes 2% of the error, the variation part – 46% and the covariation part – 52 % in 2013. The RMSPE in 2013 is equal to 2%. Those results can be seen on Figure 2 and 3 below.

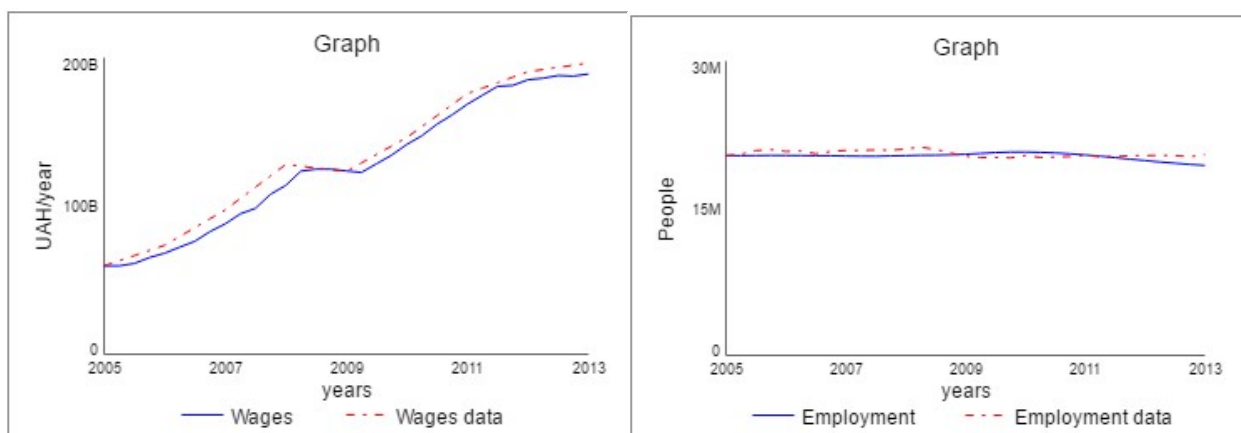


Figure 2. Comparison of model and historical data of Wages and Employment

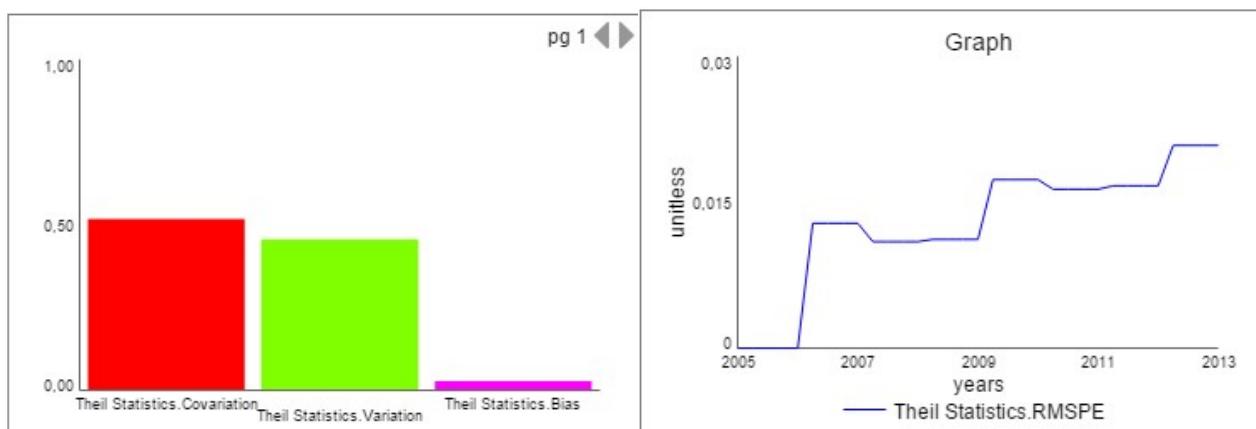


Figure 3. The Theil Statistics and RMSPE

During our work on this project we had to face some limitations that prevented us from obtaining even better results. For example, one cannot always trust the data sources; we had situations when the data on a certain variable was slightly different in different sources. Also, it is never possible to include everything in a model. Things like shadow economy and late-paid wages, which are quite significant in Ukraine, had to be ignored.

Overall, we are rather satisfied with the results of this project and the work we conducted to achieve them. We managed to adjust the model to fit Ukrainian realities and established that it can be used to study the labor sector of Ukraine. And system dynamics proved to be a great tool to do that.

References

1. Wheat, D. I. (2007). The Feedback Method: A System Dynamics Approach to Teaching Macroeconomics. PhD thesis, University of Bergen.
2. Sterman, J. D. (2000). Business Dynamics. McGraw-Hill Companies.
3. Burdett, K. and Mortensen, D. T. (1998). Wage Differentials, Employer Size, and Unemployment. *International Economic Review*, 39 (2), 257- 273.
4. Official site of the National Bank of Ukraine [Electronic source] – Access mode: <https://www.bank.gov.ua/>.
5. Official site of the State Statistics Service of Ukraine [Electronic source] – Access mode: <http://www.ukrstat.gov.ua/>.
6. Abakumova, J., Primierova, O. (2018). Globalization, growth and inequality: testing causality and asymmetries. *Ekonomicko-manazerske spektrum*, 12(2), 83-95.
7. Лук'яненко, І., Віт, Д. (2017). Системний аналіз формування державної політики в умовах макроекономічної дестабілізації.

Maryna Ushchenko
1th-year master's students, NaUKMA

APPROACH TO MODELING THE MAIN FACTORS THAT INFLUENCE THE FUNDING STRUCTURE OF COMMERCIAL BANKS

Funding is the resources that bank uses to provide its business. Sources of these funds can be deposits, funds on current accounts of clients, borrowing in Ukrainian and international capital markets, interbank loans, etc. When evaluating the financial performance of the bank the structure of the fund should be analyzed, including its maturity structure and costs. Funding can be long-term and short-term. For example, the first one includes borrowing in the capital markets, and the second one – current accounts of clients. The balance between the resource base and assets ensures the stable performance of the bank.

However, as of today, the biggest part of the banks liabilities consists of funds of the individuals and corporate clients. Their share in liabilities as of June 2018 exceeds 80 %. Due to this tendency, liquidity risks increase, because most corporate deposits consist of deposits on demand or ultra short deposits. Individuals also prefer short-term deposits (in general, among deposits prevail deposits up to 3 months). There can be several reasons for this. Firstly, now in the banking system there is a situation when with an increase in deposit term, the deposit rate almost does not increase. Such interest rate policy does not lead to the improvement in the term structure of banks deposits. Since October 2017, the NBU raised its discount rate four times (from 12.5 % to 18 %). After that, the banks ceased to reduce interest on